

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of : TERUO KAWAI

International Application No. : PCT/JP01/03901

International Filing Date : May 10, 2001

Priority Date Claimed : June 12, 2000

U.S. Serial No. : Unknown

U.S. Filing Date : Herewith

For : ELECTRIC MOTOR UTILIZING  
CONVERGENCE OF MAGNETIC  
FLUX

Examiner : Unknown

Art Unit : Unknown

Cleveland, Ohio 44115-1475

PRELIMINARY AMENDMENT

Assistant Commissioner of Patents  
Box PCT  
Washington, DC 20231

Dear Sir:

Please amend the application to be considered in the U.S. National Phase Filing Under  
35 U.S.C. 371, filed concurrently herewith, as follows.

**IN THE CLAIMS**

Please **Amend** in this application claims 1-7 as follows.

Please **Add** claims 8 and 9 . (Claims added have been numbered consecutively following the highest numbered original claims).

**MARKED-UP VERSION OF PENDING CLAIMS**

1. (Amended) An electric motor comprising:

an output member comprised of a plate-shaped magnetic material, provided with at least one radially protruding portion at an outer periphery thereof;

a magnetic flux control member of a magnetic material, disposed in a substantially parallel and spaced apart relationship with the output member [in a spaced apart relationship];

a plurality of electromagnets disposed substantially between respective outer peripheries of said output member and said magnetic flux control member, one end thereof arranged in a spaced apart relationship from the outer periphery of said output member, the other end thereof arranged in a spaced apart relationship from the outer periphery of said magnetic flux control member, said respective ends thereof having a mutual magnetic interaction with said output member and said magnetic flux control member;

a supporting mechanism for supporting at least said output member along an inner periphery of said plurality of electromagnets so that said output member is rotatable in a circumferential direction;

a magnetizing mechanism disposed between said output member and said magnetic flux control member so as to magnetize said output member and said magnetic flux control member in opposite polarities; and

a magnetizing current supply for supplying a magnetizing current to each said electromagnet with a predetermined timing so that each said electromagnet opposed to the outer peripheries of said output member and said magnetic flux control member is magnetized in an opposite polarity at [its] each end opposing against the outer periphery of said output member with an opposite polarity against a polarity of said output member by said magnetizing mechanism.

2. (Amended) An electric motor comprising:

a rotor having a pair of movable members disposed in a substantially spaced apart [to] relationship and being firmly connected to each other, each said movable member [formed of] comprising a plate-shaped magnetic material [and] having at least one elevated portion on one side surface thereof in a substantially [a] radial direction for enabling a magnetic flux to converge in a circumferential direction and passing therethrough;

a plurality of electromagnets disposed substantially between respective outer peripheries of said movable members, each end thereof arranged in a spaced apart relationship from the outer periphery of each said movable member, said respective ends thereof having a mutual magnetic interaction with said movable members;

a supporting mechanism for supporting said rotor along an inner periphery of said plurality of electromagnets so that said rotor is rotatable in a circumferential direction;

a magnetizing mechanism disposed between said movable members so as to magnetize said movable members in opposite polarities; and

3. (Amended) An electric motor [claimed in] according to claim 1 [or 2] wherein said magnetizing mechanism comprises a permanent magnet.

4. (Amended) An electric motor [claimed in] according to claim 1 [or 2] wherein said magnetizing mechanism comprises an electromagnet which is capable of regulating its magnetic magnitude.

5. (Amended) An electric motor [claimed in] according to claim 1 wherein [each] every other end of said electromagnet is connected to said magnetic flux control member.

6. (Amended) An electric motor [claimed in] according to claim 1 wherein each said electromagnet is energized so as to consecutively attract each protrusion arranged at the outer periphery of said output member.

7. (Amended) An electric motor [claimed in] according to claim 2 wherein each said electromagnet is energized so as to consecutively attract each said elevated portion arranged at the outer periphery of said movable member.

8. (New) An electric motor according to claim 2 wherein said magnetizing mechanism comprises a permanent magnet.

9. (New) An electric motor according to claim 2 wherein said magnetizing mechanism comprises an electromagnet which is capable of regulating its magnetic magnitude.

CLEAN VERSION OF PENDING CLAIMS

## 1. An electric motor comprising:

an output member comprised of a plate-shaped magnetic material, provided with at least one radially protruding portion at an outer periphery thereof;

a magnetic flux control member of a magnetic material, disposed in a substantially parallel and spaced apart relationship with the output member;

a plurality of electromagnets disposed substantially between respective outer peripheries of said output member and said magnetic flux control member, one end thereof arranged in a spaced apart relationship from the outer periphery of said output member, the other end thereof arranged in a spaced apart relationship from the outer periphery of said magnetic flux control member, said respective ends thereof having a mutual magnetic interaction with said output member and said magnetic flux control member;

a supporting mechanism for supporting at least said output member along an inner periphery of said plurality of electromagnets so that said output member is rotatable in a circumferential direction;

a magnetizing mechanism disposed between said output member and said magnetic flux control member so as to magnetize said output member and said magnetic flux control member in opposite polarities; and

a magnetizing current supply for supplying a magnetizing current to each said electromagnet with a predetermined timing so that each said electromagnet opposed to the outer peripheries of said output member and said magnetic flux control member is magnetized in an opposite polarity at each end opposing against the outer periphery of said output member with an opposite polarity against a polarity of said output member by said magnetizing mechanism.

## 2. An electric motor comprising:

a rotor having a pair of movable members disposed in a substantially spaced apart relationship and being firmly connected to each other, each said movable member comprising a plate-shaped magnetic material having at least one elevated portion on one side surface thereof in a substantially radial direction for enabling a magnetic flux to converge in a circumferential direction and passing therethrough;

a plurality of electromagnets disposed substantially between respective outer peripheries of said movable members, each end thereof arranged in a spaced apart relationship from the outer periphery of each said movable member, said respective ends thereof having a mutual magnetic interaction with said movable members;

a supporting mechanism for supporting said rotor along an inner periphery of said plurality of electromagnets so that said rotor is rotatable in a circumferential direction;

a magnetizing mechanism disposed between said movable members so as to magnetize said movable members in opposite polarities; and

3. An electric motor according to claim 1 wherein said magnetizing mechanism comprises a permanent magnet.

4. An electric motor according to claim 1 wherein said magnetizing mechanism comprises an electromagnet which is capable of regulating its magnetic magnitude.

5. An electric motor according to claim 1 wherein every other end of said electromagnet is connected to said magnetic flux control member.

6. An electric motor according to claim 1 wherein each said electromagnet is energized so as to consecutively attract each protrusion arranged at the outer periphery of said output member.

7. An electric motor according to claim 2 wherein each said electromagnet is energized so as to consecutively attract each said elevated portion arranged at the outer periphery of said movable member.

8. An electric motor according to claim 2 wherein said magnetizing mechanism comprises a permanent magnet.

9. An electric motor according to claim 2 wherein said magnetizing mechanism comprises an electromagnet which is capable of regulating its magnetic magnitude.

REMARKS

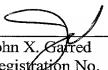
The subject amendment is made to eliminate multiple dependent claims, and to otherwise put the claims in a format more aligned with conventional US practice. Accordingly, no new matter is provided by the subject amendment. Entry of the amendment and allowance of all claims is therefore respectfully requested.

The Commissioner is hereby authorized to charge any fees or credit any over-payment associated with this communication to Deposit Account No. 50-0902 (74457/20093).

Respectfully Submitted,

ARTER & HADDEN, LLP

Date: 11 Januy 2002

  
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